#EMD2023

EMD

EUROPEAN MARITIME DAY

Brest

24-25 May 2023

EU4Algae Roadshow

Spotlight on innovative EU algae projects

European Commission

SECRÉTARIAT D'ÉTAT CHARGÉ DE LA MER

Région Bretagne

Finistère Penn-ar-Bed

Brest Métropole

AGENDA

16h15-16h20: **Welcome and introduction**

16h20-16h30: **The EU Algae Initiative and EU4Algae**

16h30- 17h00: **Presentation of the 4 flagship projects**:

Realm, Seamark, Circalgae, and AlgaeProBANOS.

17h00-17h20: **Moderated panel discussion**

17h20-17h30: **Q&A & wrap up of the session**

EU Algae Initiative

Latest developments and next steps

European Maritime Day
24 May 2023

Maris Stulgis
Policy Officer Blue Bioeconomy, Algae & Aquaculture
DG MARE – European Commission

The EU algae initiative was announced mid-November 2022

EUROPEAN
COMMISSION

Brussels, 15.11.2022
COM(2022) 592 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Towards a Strong and Sustainable EU Algae Sector

{SWD(2022) 361 final}

Virginijus Sinkevičius • 1er
European Commissioner for Environ
1 sem. •

Pioneering EU initiative just out!

We present 23 actions to boost the Algae sector in Europe.

The EU Algae Initiative – How did we get there?

Problems

- High production costs
- Low-scale production
- Limited knowledge of risks and environmental impacts of algae cultivation
- Fragmented governance framework

Objectives

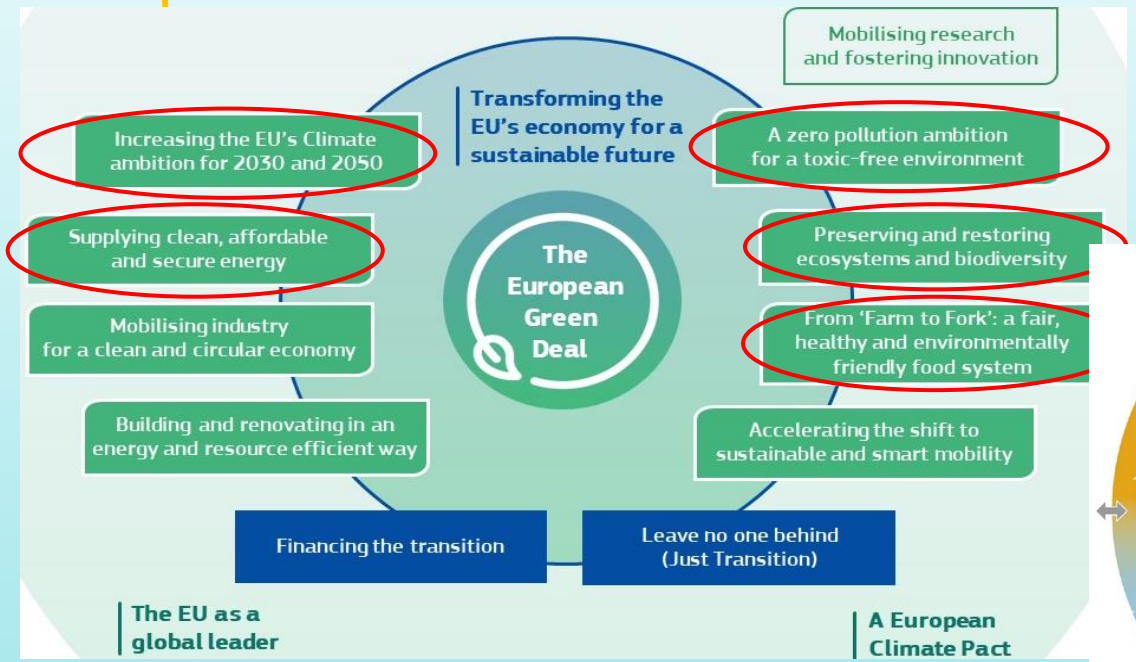
Unlocking EU algae potential:

- Increasing sustainable production, safe consumption and innovative use of algae products
- Upscaling regenerative algae cultivation
- Developing and mainstreaming the markets for food and non-food algae applications

Action areas

1. The improvement of governance framework and legislation
2. Supporting the improvement of business environment
3. Closing knowledge, data, technological and innovation gaps
4. Increasing social awareness and acceptance

Synergies with other EU initiatives



The EU Algae Initiative – a cross-DG initiative

- **Algae testing and extraction as well as algae biofuel standards** (ENER)
- **Algae-based materials in fertilising products** (GROW)
- **Use of nutrients and CO2 for microalgae cultivation and certification** (AGRI)
- **Iodine and contaminants in algae** (SANTE, EFSA)
- **Algae biofuel-specific technological and systemic challenges, processing and cultivation systems development** (RTD)
- **Harmonize algae-related data** (JRC, ESTAT)

Action 9: Funding pilot project's to support reorientation of fishers' careers to regenerative ocean farming

EMFAF 2022 Flagship for Baltic Sea

OBJECTIVE: Reorienting fishers to ocean regeneration activities

SCOPE

- Knowledge creation and sharing, and identification of skills and training for regenerative ocean farming;
- Access to space and water, (marine protected areas);
- Permitting and authorisation processes (installation of regenerative ocean farms);
- Demonstration activities for setting and operating regenerative ocean farming.

Baltic Sea (Topic 6): **EUR 600 000**
Co-funding: **80%**
Partners: **Min 3 – from 2 EU MSs**

European Commission

EMFAF Flagship for Baltic Sea:

- €600.000
- Application phase closed on 31/01/2023
- One excellent proposal received

Horizon Europe call on regenerative ocean farming:

- €3.000.000
- Application phase closed on 27/09/2022
- 3 proposals received

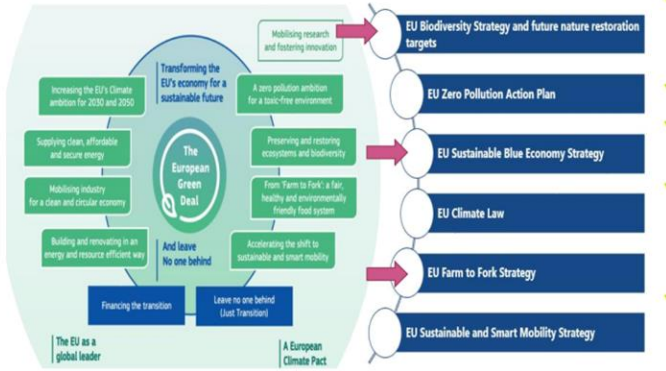
EUROPEAN UNION

EU MISSIONS
RESTORE OUR OCEAN & WATERS

HORIZON-MISS-2022-OCEAN-01-10

Towards local community-driven business models: regenerative ocean farming

POLICY CONTEXT



EXPECTED OUTCOMES

- ✓ Evidence-based business plans for local community-driven regenerative ocean farming initiatives
- ✓ Job creation and new skills
- ✓ New ecosystem services from marine and coastal ecosystems
- ✓ Preserved local marine and costal ecosystems, biodiversity and genetic diversity; increased resilience of coastal and marine areas to climate change
- ✓ Improved marine and coastal habitats and increased knowledge on the impact of ocean farming on local marine and coastal environment conditions

Next Steps

- Commission is coordinating the implementation of the 23 actions with MS, the industry (notably via the EU4Algae forum) and other relevant stakeholders (external as well as internal).
- Awareness & communication: ***1st EU Algae Awareness Summit***, - Maison de l'Ocean -5-7 October 2023, Paris - To **inspire MS** for change by sharing good practices and success stories

European Commission

A collaborative European stakeholders' forum

*The **ultimate objective** of the #EU4Algae **is to accelerate the scale up of a regenerative, resilient, fair and climate friendly algae industry in Europe**.*

About EU4Algae

EU4Algae Forum is the **platform**

gathering **algae interested parties**, from all relevant public and private organizations,

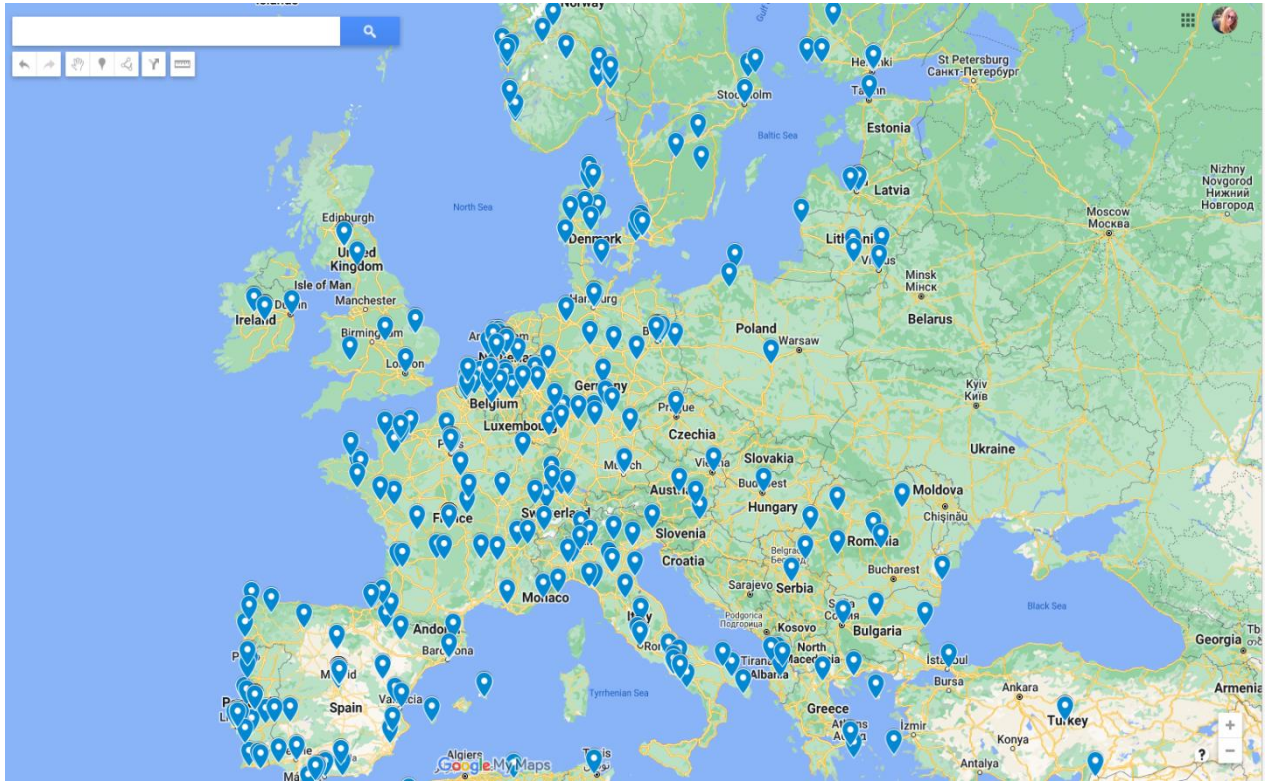
to jointly implement the EU Algae Initiative,

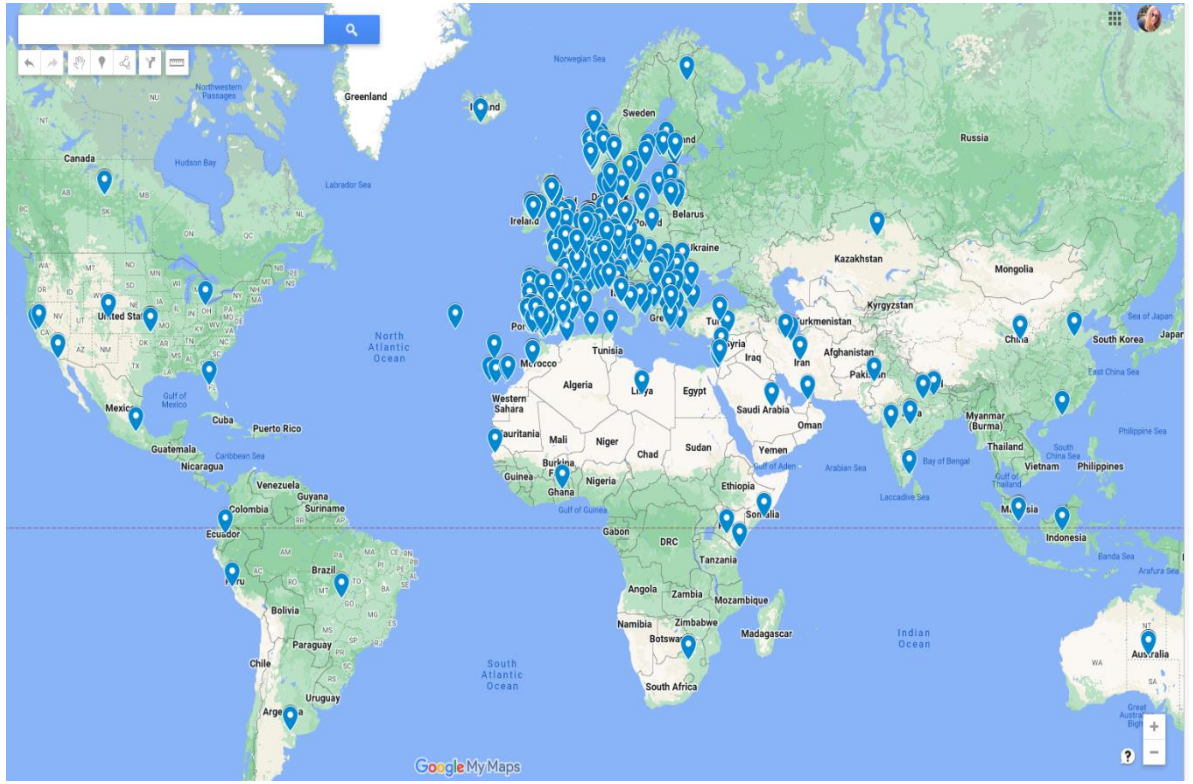
while offering a **forum to openly speak and discuss** market driven breakthroughs for the sector.

The ultimate objective is to accelerate the scale up of a regenerative, resilient, fair and climate friendly algae industry in Europe.

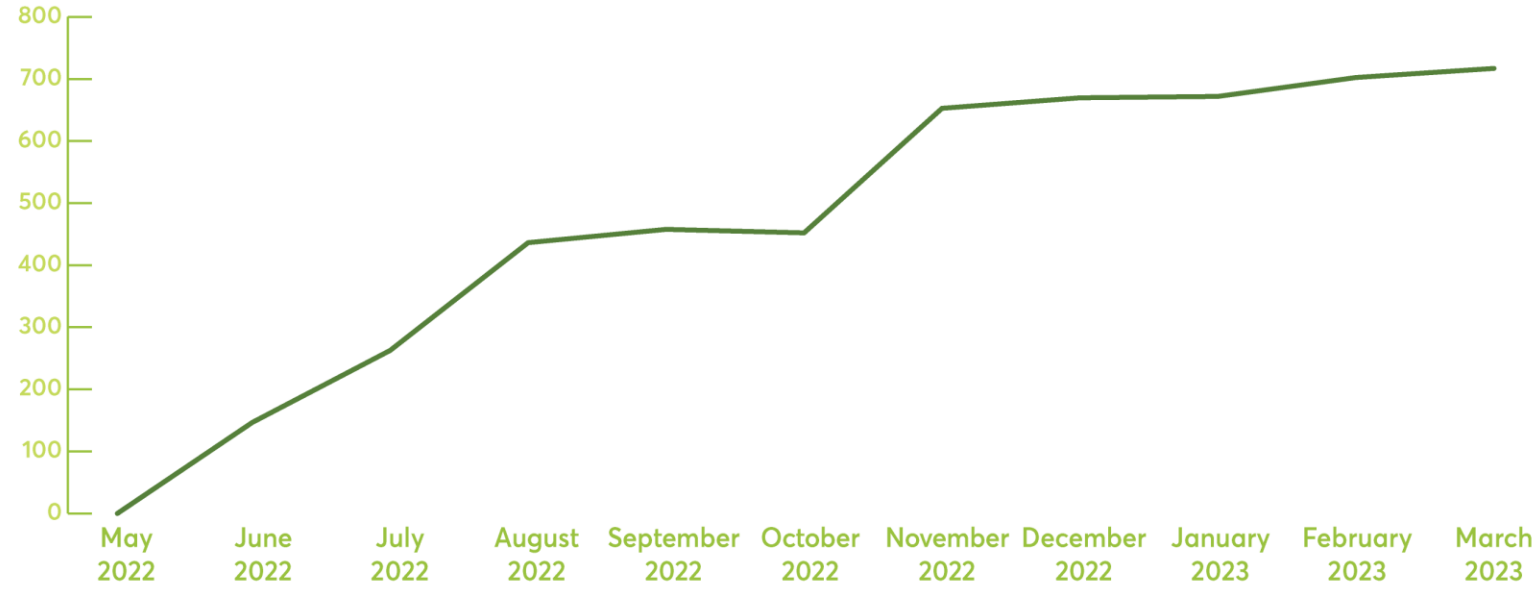
EU4Algae registered members

+700 members registered and participating in WGs discussions





Evolution of new registered members



Note: 104 members were directly added to the community without registering

Sectors

Note: Producers are usually also product developers and product developers are also quite frequently technology providers.

Countries

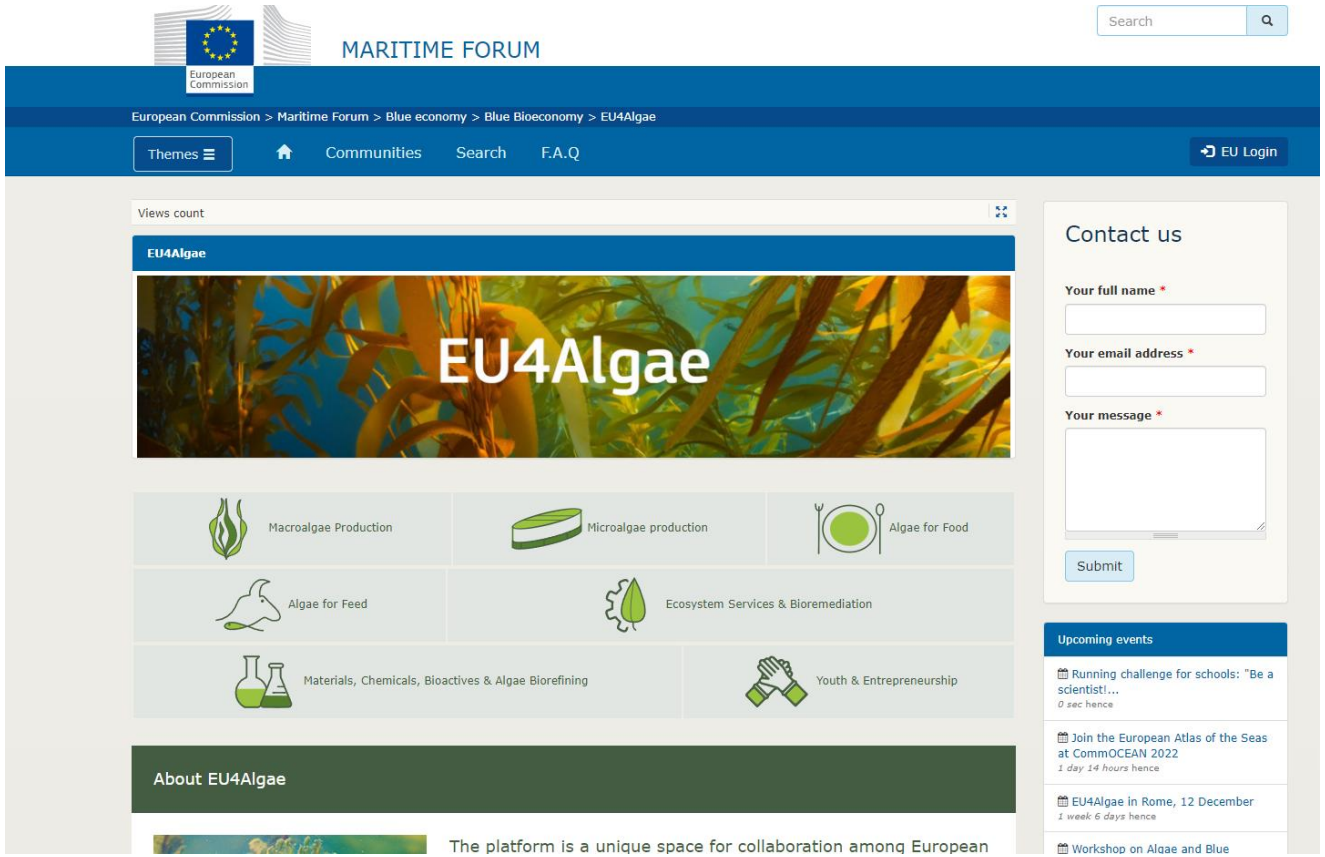
Europe:

1. Spain
2. Germany and France
3. Italy
4. UK
5. Netherlands
6. Portugal
7. Belgium
8. Denmark and Norway

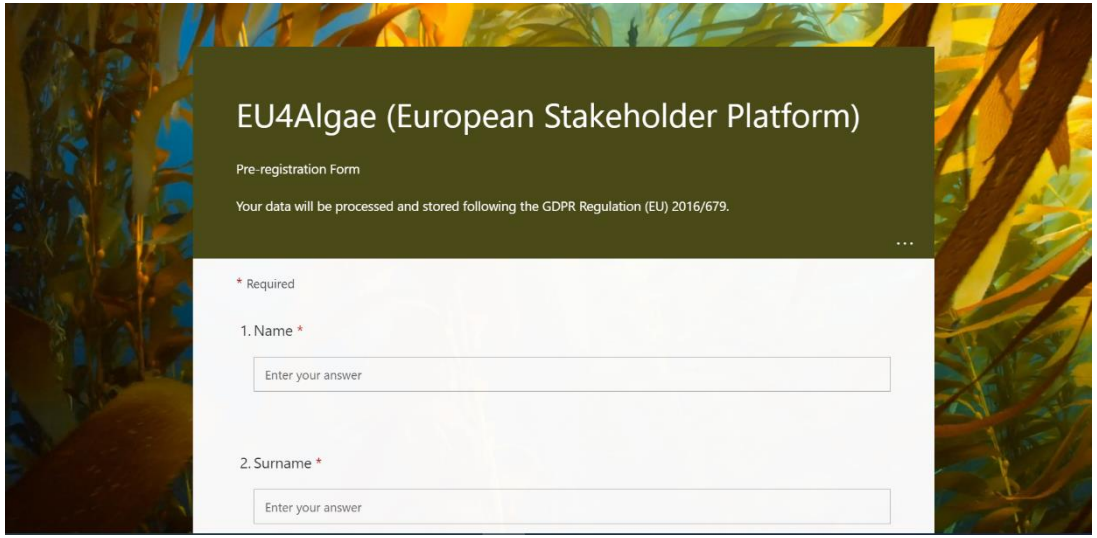
Outside Europe:

1. Turkey
2. US

EU4Algae online Forum



[| Maritime Forum (europa.eu)]



Get to know the seven EU4Algae Working Groups

European Commission

#EU4Algae

EU4Algae Working Groups

Current Working Groups are:

- Working Group 1. **Macroalgae Production** (Facilitator: Systemiq)
- Working Group 2. **Microalgae Production** (Facilitator: EABA)
- Working Group 3. **Algae for Food** (Facilitator: EABA)
- Working Group 4. **Algae for Feed** (Facilitator: s.Pro)
- Working Group 5. **Ecosystem Services / Bioremediation** (Facilitator: s.Pro)
- Working Group 6. **Materials/Chemicals/Bioactives and Algae Biorefining** (Facilitator: EABA)
- Working Group 7. **Youth and Entrepreneurship** (Facilitator: s.Pro)

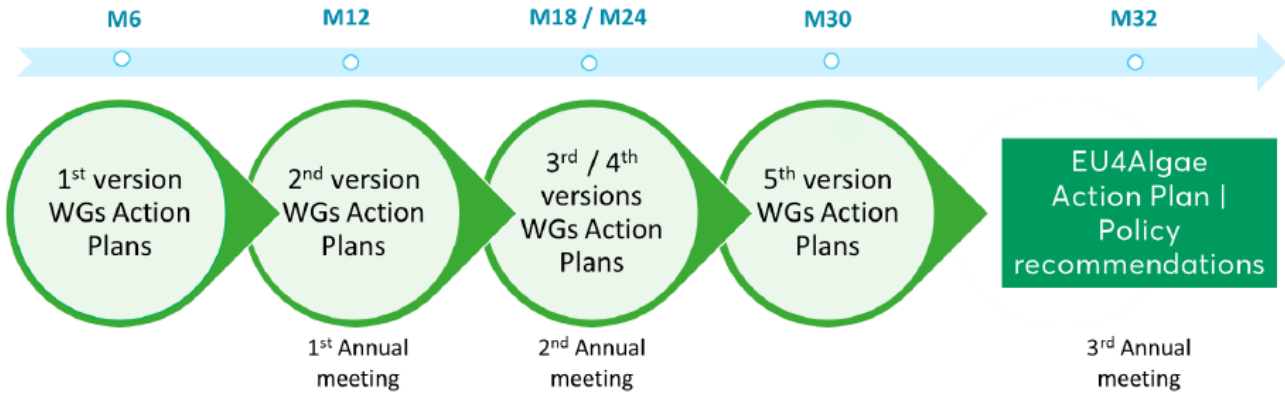
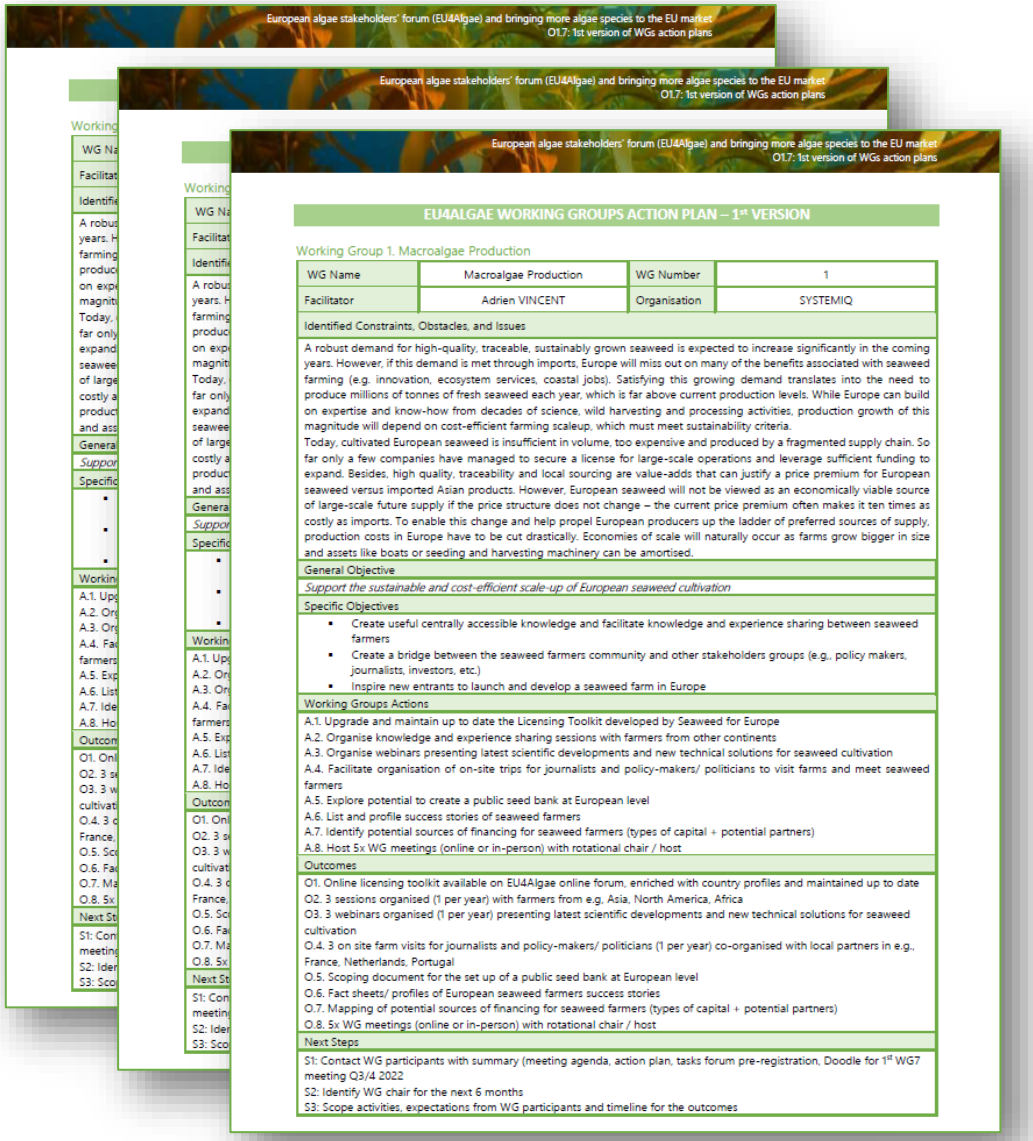


Figure 12: EU4Algae Working Groups workflow and outcomes

EU4Algae event in Rome on 12 December

Working groups – Action Plans´ structure



- Constraints and challenges
- Objectives
- Actions
- Outcomes
- Next steps

"EU4Algae already played an important role during the preparation of the EU Algae Initiative, and I am very thankful for that!

Moreover, I trust that EU4Algae will play an active role in making the EU Algae Initiative a success story. Such a collaboration is crucial as ultimate goal of the initiative is to support algae sector that at the end of the day will create the added market value.

So, the Commission will continue to work hand in hand with the EU4Algae and other relevant stakeholders to let the EU Algae sector to thrive."

Delilah AL KHUDHAIRY
Director of MARE Directorate A: Maritime Policy and Blue Economy
EU4Algae meeting 12 December 2022

SEAMARK
Seaweed-based
Market Applications

SeaMark - Seaweed-based Market Applications:
"Unlocking the potential of macroalgae for a thriving European blue bioeconomy"

OLAVUR GREGERSEN
SEAMARK PROJECT CO-ORDINATOR &
CEO IN OCEAN RAINFOREST

Co-funded by
the European Union

The pain – and the gain!

PROBLEMS TO SOLVE:

Global shortages of sustainable and healthy feed and food.

To mitigate climate change..

OUR SOLUTION:

Cultivate seaweed as they are among the fastest growing crops on the planet. To grow, they only need sunlight, CO_2 and natural nutrients.

THE MARKET

Increasing demand in Europe and North America to use seaweed in human food, animal feed, as bio stimulants for agriculture, and replacing fossil-based packaging material (bio-plastic).

Geographic focus and the product focus

Fresh biomass

Healthy and tasty food

Functional feed (health and reducing feed)

Food ingredients, bioplastic

- <u>In Europe</u>: Scale up operation in the Faroe Islands as fast as possible and, at the same time, start production in other locations in collaboration with local partners.
- <u>In Alaska</u>: Source seaweed from existing farmers and establish primary production in collaboration with local partners.
- <u>In California</u>: Continue to commercialize cultivation of Giant Kelp.

OCEAN RAINFOREST

The SeaMark Consortium

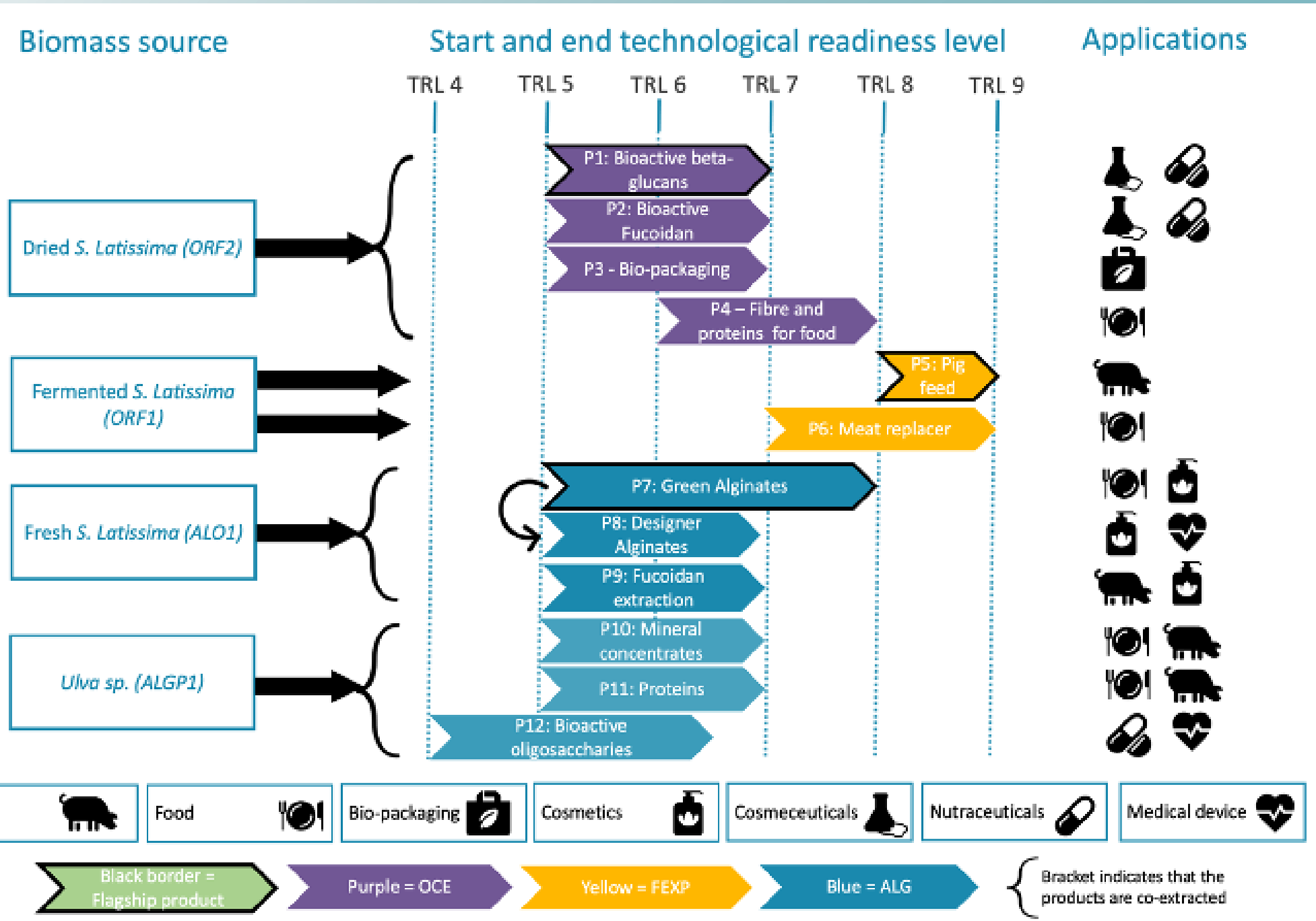
Breeding & cultivation

Processing into seaweed-based product applications

Market -, environmental-, socio- & techno-economic assessments & DCE

Overall objective

SeaMark will demonstrate how to scale up innovative seaweed cultivation and processing into price-competitive product applications making the entire supply chain attractive for commercial investments


Biomass source
Start and end technological readiness level
Applications
TRL 4
TRL 5
TRL 6
TRL 7
TRL 8
TRL 9
Dried S. Latissima (ORF2)
Fermented S. Latissima (ORF1)
Fresh S. Latissima (ALO1)
Ulva sp. (ALGP1)
P1: Bioactive beta-glucans
P2: Bioactive Fucoidan
P3 - Bio-packaging
P4 – Fibre and proteins for food
P5: Pig feed
P6: Meat replacer
P7: Green Alginates
P8: Designer Alginates
P9: Fucoidan extraction
P10: Mineral concentrates
P11: Proteins
P12: Bioactive oligosaccharies
Feed
Food
Bio-packaging
Cosmetics
Cosmeceuticals
Nutraceuticals
Medical device
Black border = Flagship product
Purple = OCE
Yellow = FEXP
Blue = ALG
Bracket indicates that the products are co-extracted

Key Exploitable Results of SeaMark

No.	
KER1	A suite of 12 products for high and low value market segments
KER2	Protocols for genetic breeding increasing yield with more than 50% compared to today
KER3	Prototypes for large scale and automated seeding, harvesting and landing technologies
KER4	Validated business models for four different supply chains
KER5	Good Practice recommendations on Life Cycle Assessments
KER6	Strategic development plan for the scale-up of the European seaweed industry
KER7	Policy and investor recommendation for scaling up to 30 million T biomass in 2050

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The European seaweed industry is the fastest growing form of aquaculture, but supply chains have yet to reach industrial capacities. A wide range of claims are made about seaweed's health and environmental benefits. In Europe especially, these claims require substantiation before products can reach the market and gain real traction.

To achieve this, buyers and sellers of seaweed biomass need to identify and understand logistical, regulatory and commercial requirements to ensure safe, sustainable and price-competitive products for consumers.

Register your interest in the SeaMark Market Platform to co-develop

PRODUCT(S) OF INTEREST

- [ ] P1: Bioactive beta-glucans (flagship)
- [ ] P2: Bioactive fucoidan
- [ ] P3: Bio-packaging materials
- [ ] P4: Fibre & protein food ingredients
- [ ] P5: Pig feed supplement (flagship)
- [ ] P6: Meat replacer
- [ ] P7: Green alginate (flagship)
- [ ] P8: Designer Alginates
- [ ] P9: Fuciodan extraction with enzymes
- [ ] P10: Mineral concentrates
- [ ] P11: Proteins
- [ ] P12: Bioactive oligosaccharides

APPLICATION(S) OF INTEREST

- [ ] Pharmaceuticals & Medical Devices
- [ ] Cosmetics
- [ ] Human food
- [ ] Feed additives
- [ ] Bio-packaging
- [ ] Processing Machinery
- [ ] Ecosystem Services
- [ ] Other (please specify below)

The main impact in 2030

- Technical innovations to upscale production, while reducing production costs.
- Uniform standards for existing products and production methods.
- An increased European seaweed supply has the potential to diversify value chains with multiple high value-added products.
- Additional economic benefits include potential monetisation of ecosystem services.
- Boost European resource self-sufficiency, resilience, and competitiveness.
- Creation of knowledge-based jobs in coastal and rural areas.

www.seamark.eu

@seamarkeu

seamarkeu

Olavur Gregersen

Ocean Rainforest

Olavur@oceanrainforest.com

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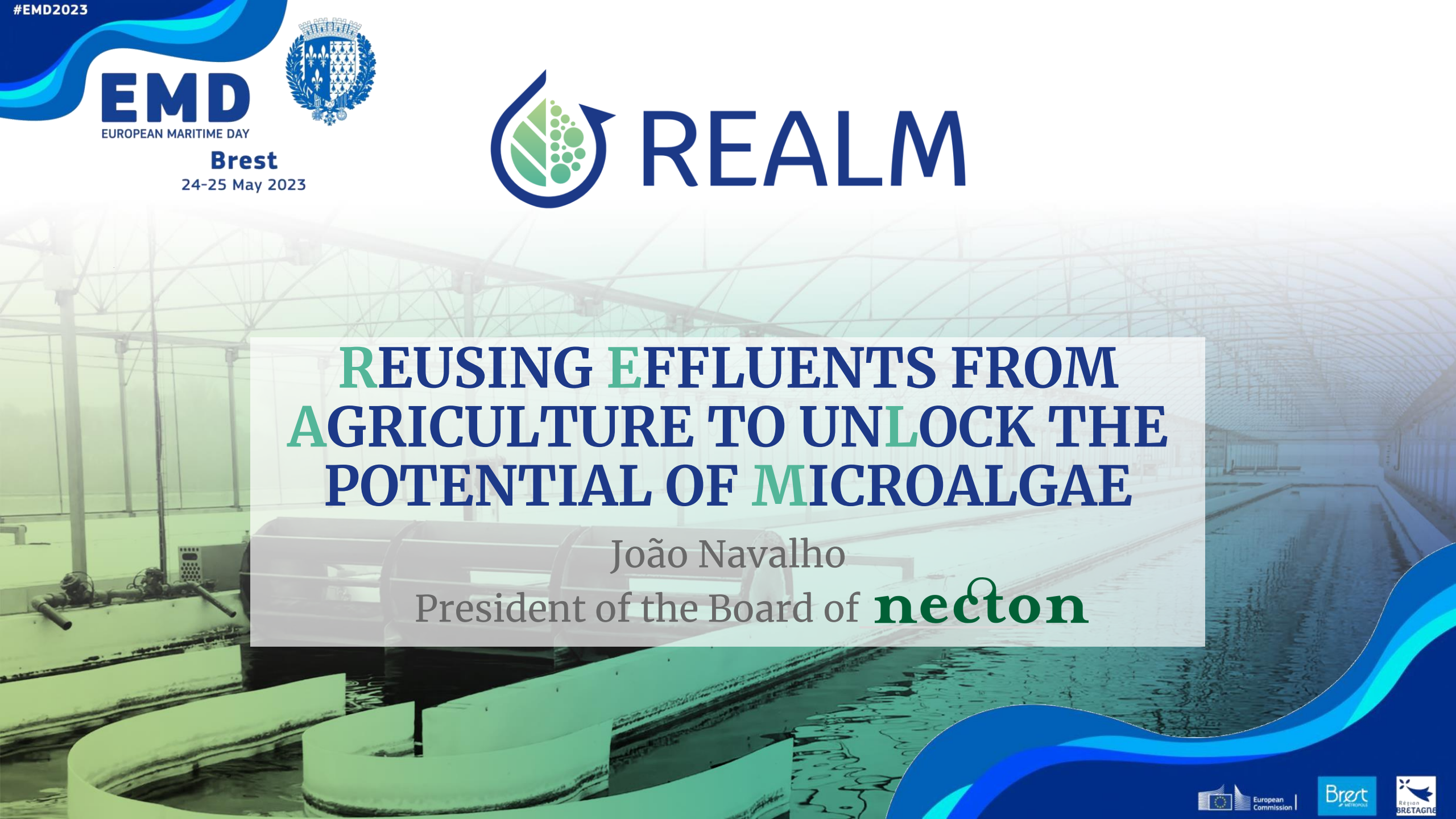
REALM



REUSING EFFLUENTS FROM AGRICULTURE TO UNLOCK THE POTENTIAL OF MICROALGAE

João Navalho
President of the Board of necton

European Commission | Brest Métropole | Région Bretagne

João Navalho

Marine Biologist, MSc Aquaculture

- Co-founder and President of the Board at Necton S.A.
- President of the Board at Allmicroalgae S.A.
- President at Proalga – Portuguese Association for Algae Producers
- Vice President at GreenColab – Portuguese Collaborative Laboratory for Algal Biotechnology
- Member of the Industry Committee at EABA

All the expressed opinions are my own and does not bind any of the organizations I'm collaborating with

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The call

HORIZON-CL6-2021-CIRCBIO-01-09

- ✓ European Green Deal
- ✓ EU bioeconomy strategy
- ✓ Blue growth strategy

«…support the development of algae-based greener aquatic industrial products/processes and/or environmental services sustaining the health of aquatic ecosystems for a healthy planet and people.»

REALM

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The idea

- Excess nutrients from the drain water of Soilless Cultures, need to be removed before discharge;
- Future policies will be based on more sustainable horticulture cultivation methods:
- Closed systems require water treatment to prevent lower crop development or diseases.

- Microalgae are an exponentially growing feedstock for many applications;
  - EU demand for algae and algae-based products is expected to increase
  - Can help to treat several types of wastewater.
  - Applications are limited by high production prices;
  - Water related activities need to adjust to more sustainable and circular economy approaches.

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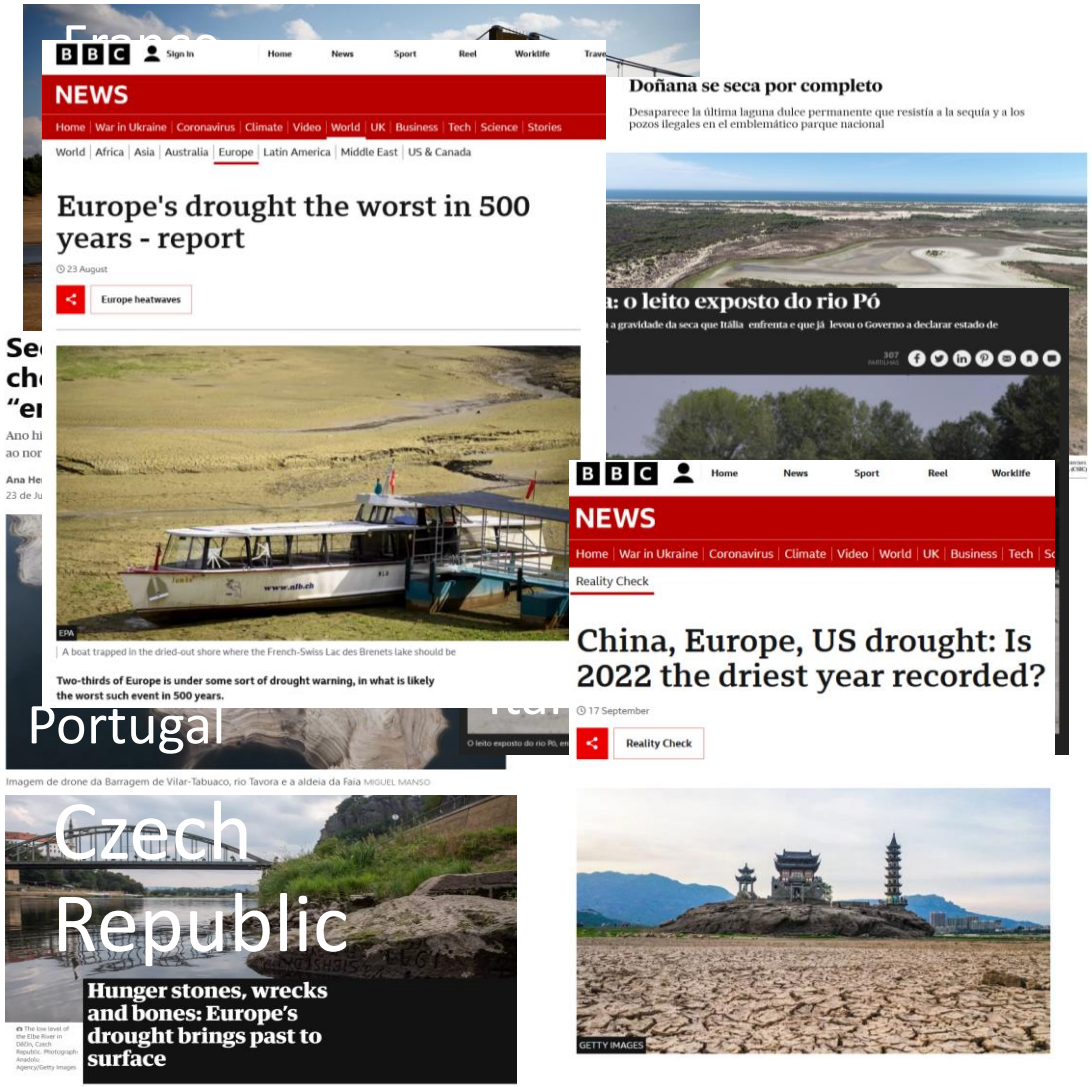
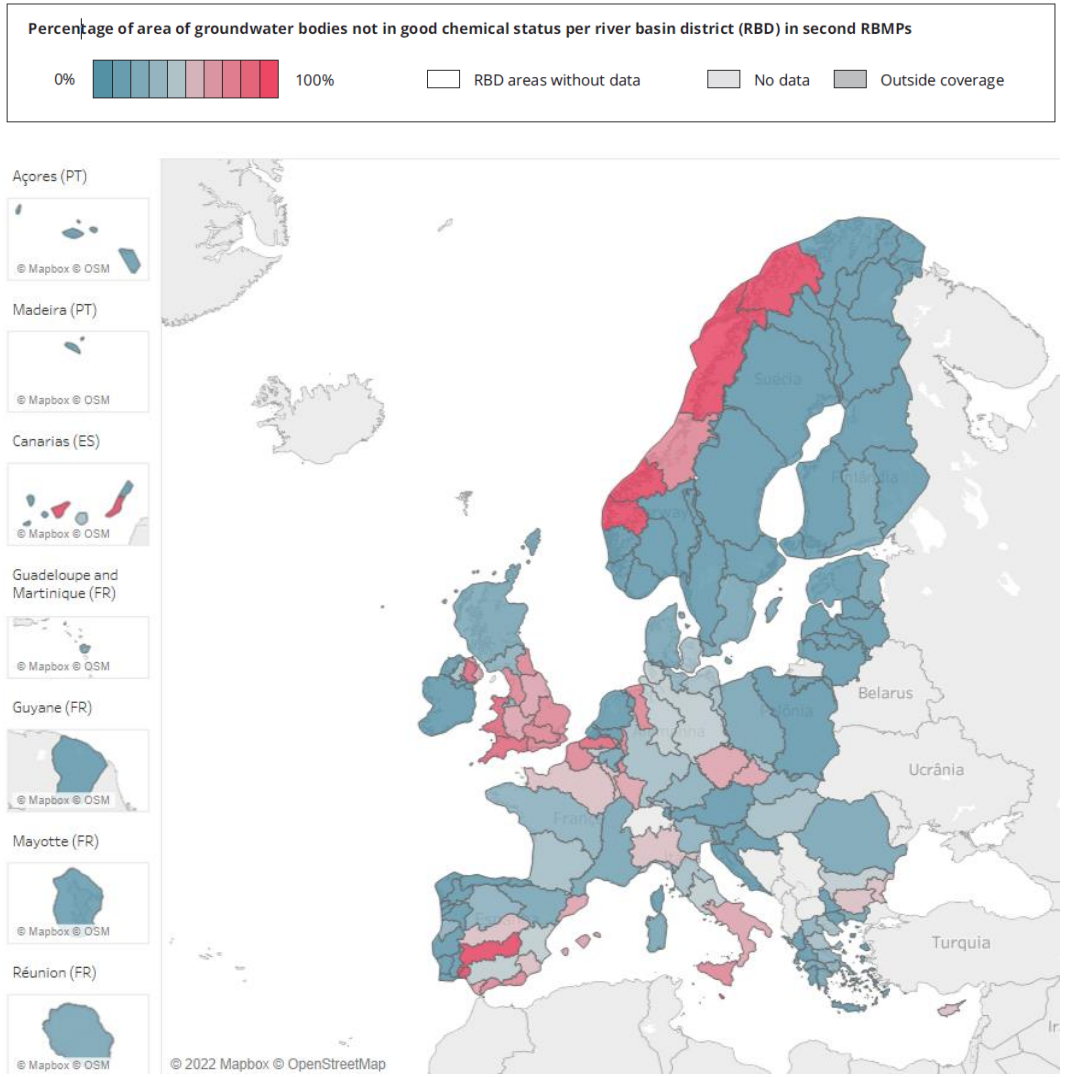
Water





Source: Results are based on the WISE-SoW database. Groundwater bodies failing to achieve good status, by RBD.

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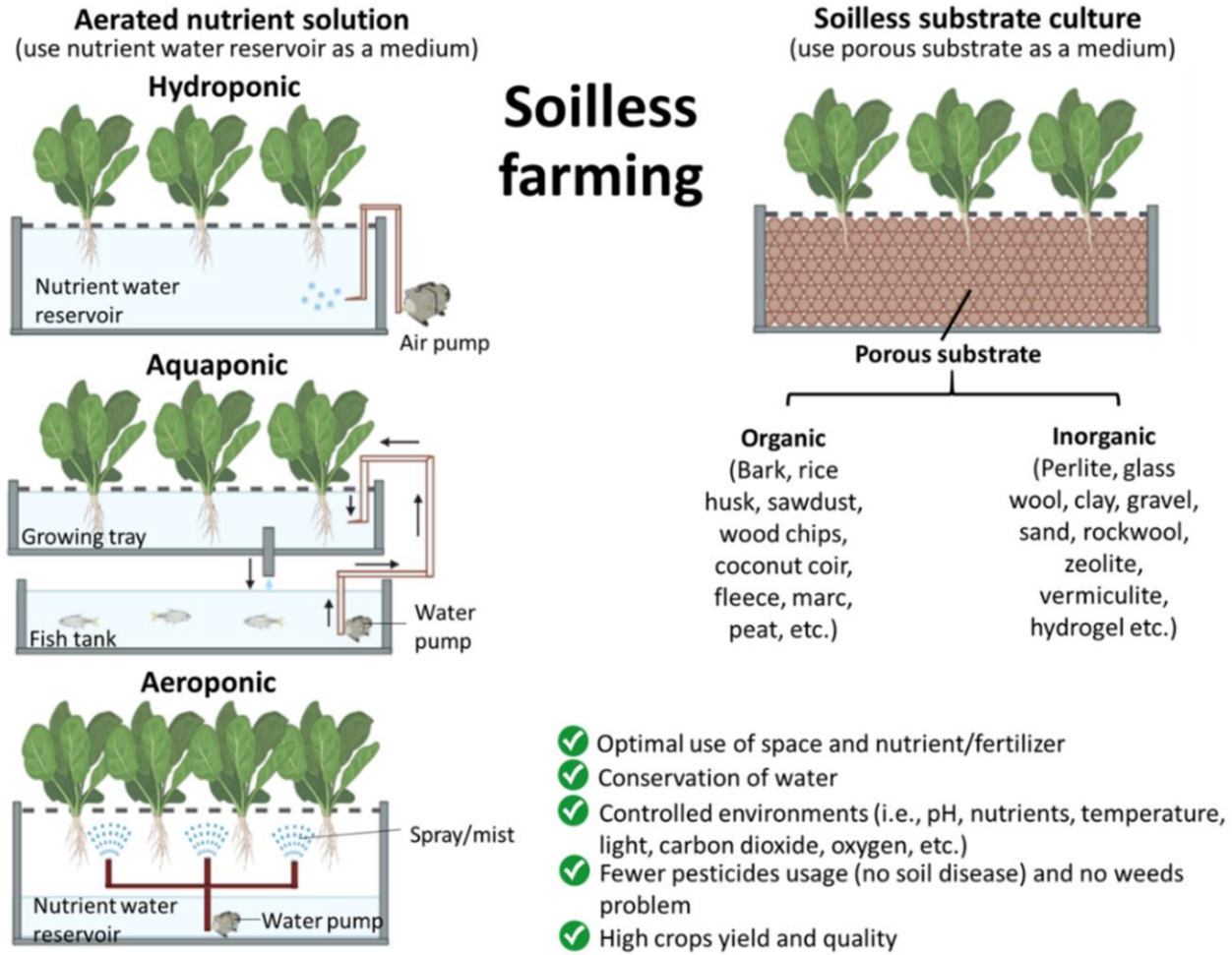
Soilless farming



- Optimal use of space and nutrient/fertilizer
- Conservation of water
- Controlled environments (i.e., pH, nutrients, temperature, light, carbon dioxide, oxygen, etc.)
- Fewer pesticides usage (no soil disease) and no weeds problem
- High crops yield and quality

Closed systems:

- ✓ Valorises the drain water
- ✓ Reduces the environmental impact
- X Requires good water quality.
- X It's not always economically viable

Maluin et al., **2021**; https://doi.org/10.3390/agronomy11061213

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Trend

With 13,000 ha under hydroponic cultivation, corresponding to 50% of the value of all fruits and vegetables grown in the country, the Netherlands has been the world leader in the use of hydroponic technology.


Photo credit: National Geographic

With >30.000 ha, Almeria in Spain forms the largest concentration of greenhouses in the world.


Photo credit: Yann Athus-Bertrand

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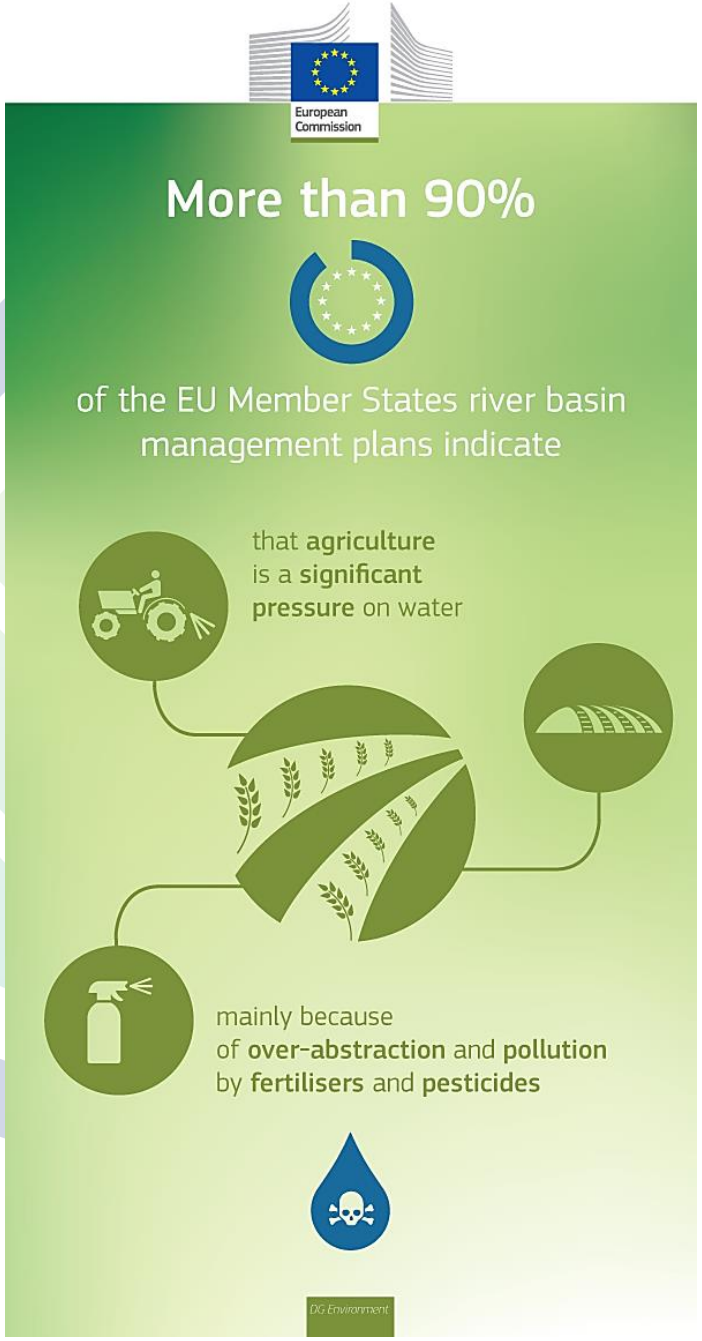
Policies

As a major source of pollution, agricultural pressures on water resources need to be addressed to ensure the full implementation of current legislation but also the adoption of more sustainable ways to produce and use chemicals:

- Good water management
- Improvement on the sustainability of the horticultural model

✓ **An increase in legal limitations to the rejection of drainage is expected.**

✓ **To further limit nutrient releases, more stringent limit values to treat Nitrogen and Phosphorus will be progressively applied**



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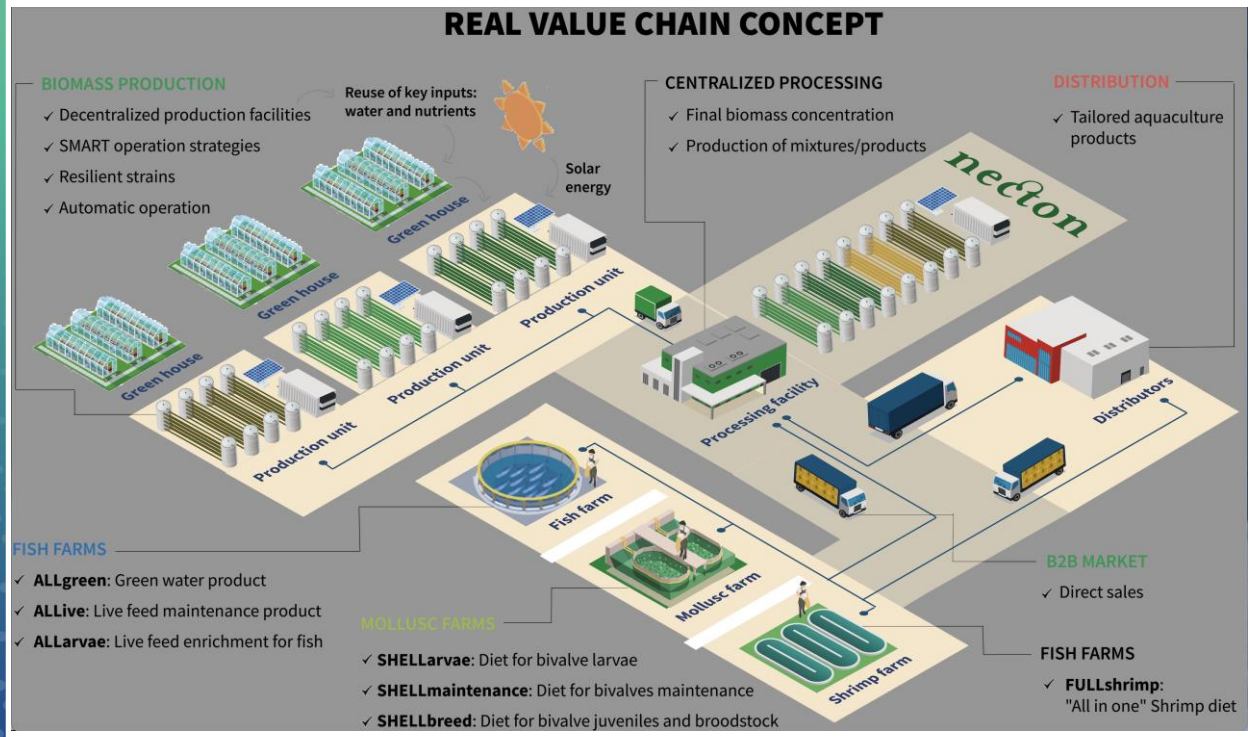
THE HURDLE TO OVERCOME



MICROALGAE PRODUCTION COSTS

- Real costs are far above what is stated in the literature. Lack of a common basis for cost calculation and comparison.
- Labor, energy and CO_2 are by far the major costs.
- Most companies are small and micro size, **scale is missing for cost reduction**, though the BIG scale is taken!
- Yeld is low, to many un-optimized steps.
- Strains are rustic, not optimized for intensive production.
- Contamination crashes are frequent leading to high non-productive times.
- Multispecific production facilities are much less efficient and that impact hardly in the costs.
- CAPEX is very high; production equipment are expensive, as well DSP equipment and all the necessary instruments and control tools.

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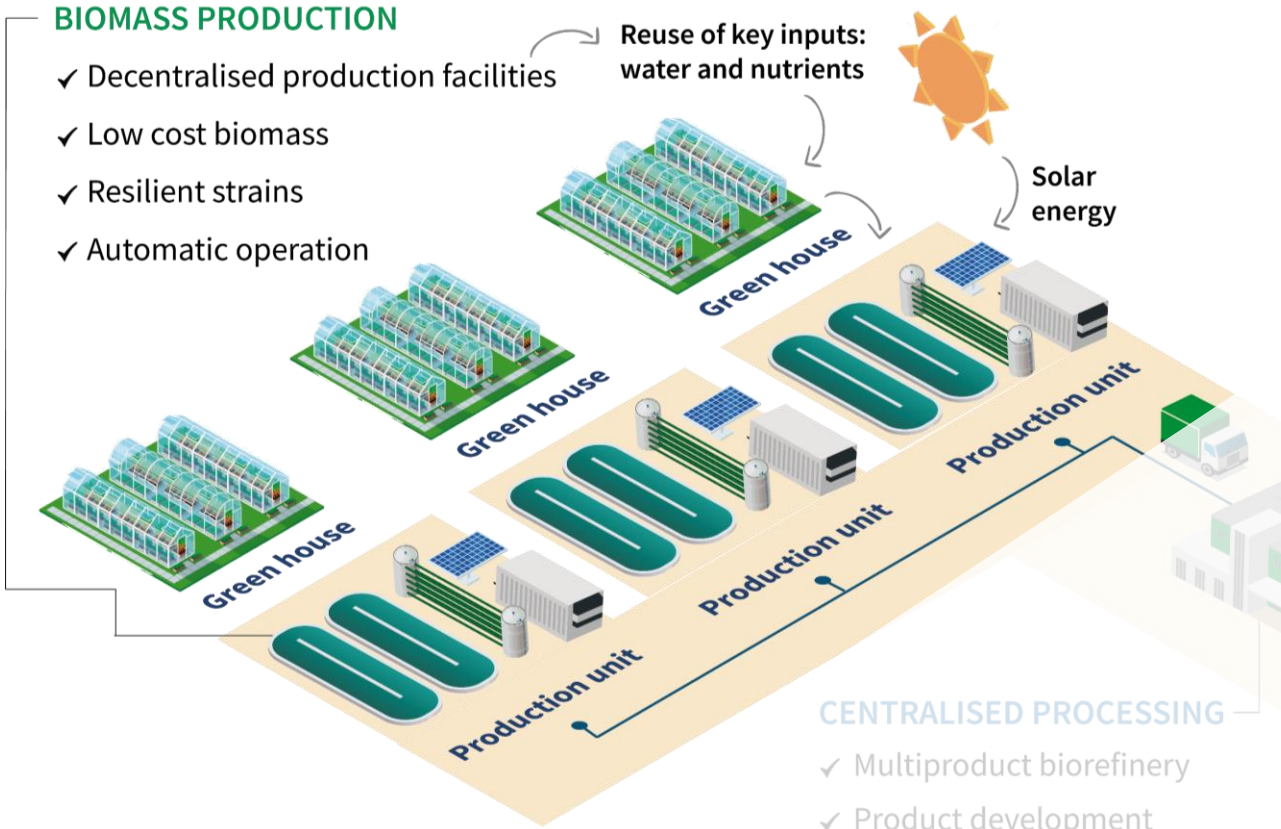
The concept



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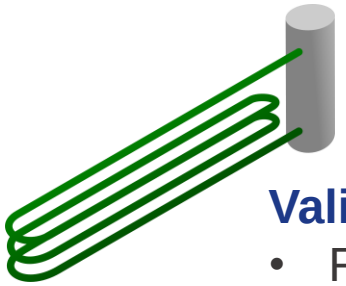
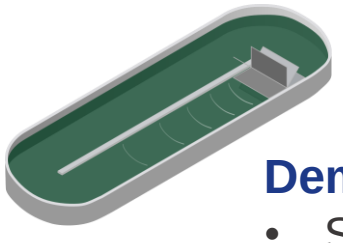
The concept



Validation facilities:

- Finland
- Netherlands



Demonstration facilities:

- Spain
- Portugal

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Consortium

Universities

WAGENINGEN UNIVERSITY & RESEARCH

UNIVERSIDAD DE ALMERÍA

UCA Universidad de Cádiz

UNIVERSITY OF TURKU

UNIVERSITY OF TWENTE.

Non-profit

OnePlanet Research Center

GreenCoLab

ESCI

imec

S²AQUA

Companies

Biorizon biotech

GRUPO LA CAÑA

necton

DECERNA

phycoworks

HUBEL Verde

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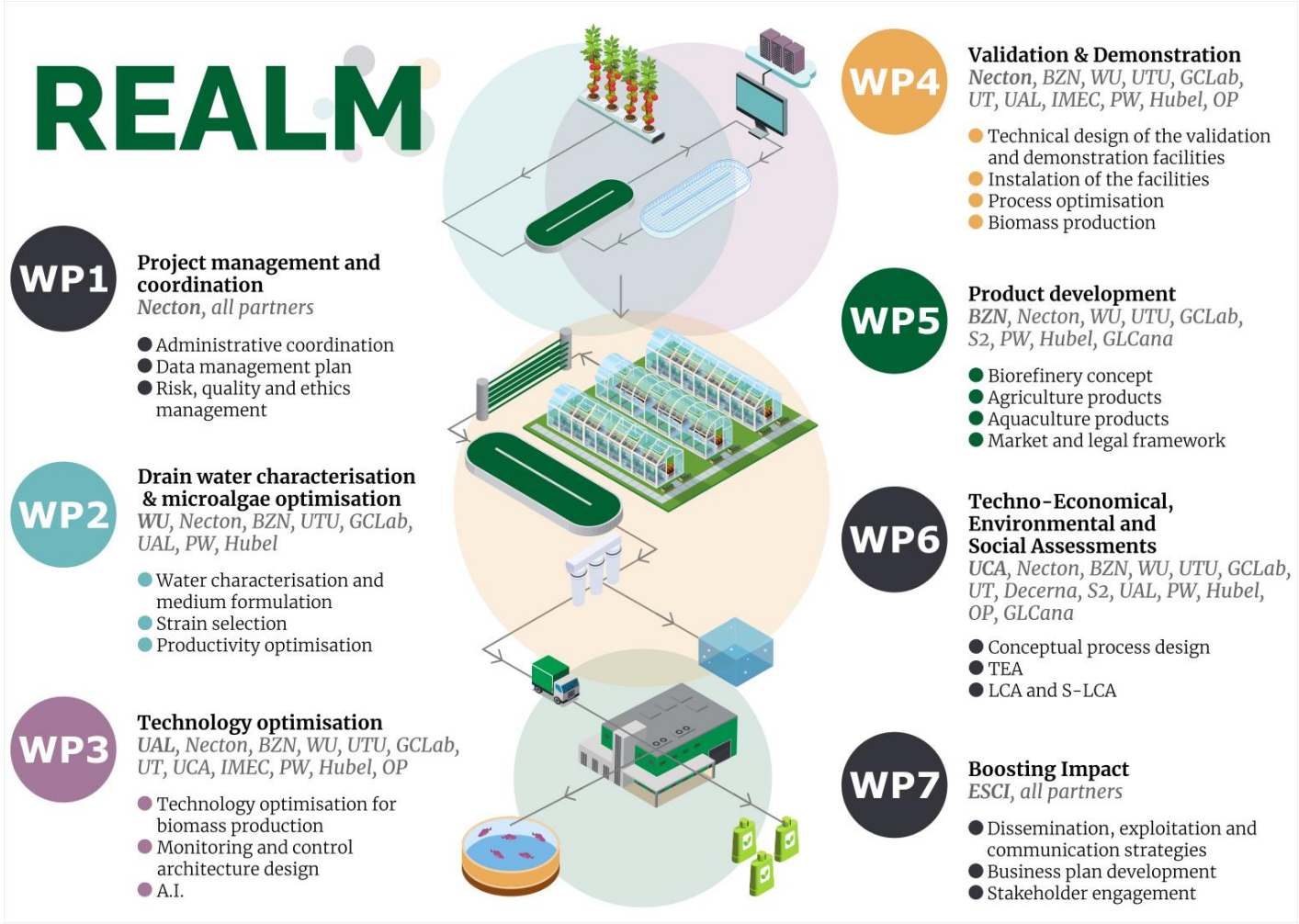
Work plan



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Expected outcomes

Less than
15mg/L of total nitrogen
left in the drainwater

More than
8 new products
for agriculture and aquaculture

Capturing
CO_2
directly from the air

Reducing
Freshwater
consumption

At least
50% less energy consumption
in microalgae production

Less than
10€ production costs
for microalgae per kg dry weight

Up to
30% more biomass
produced

In 2026
the REALM business model
will be ready for replication

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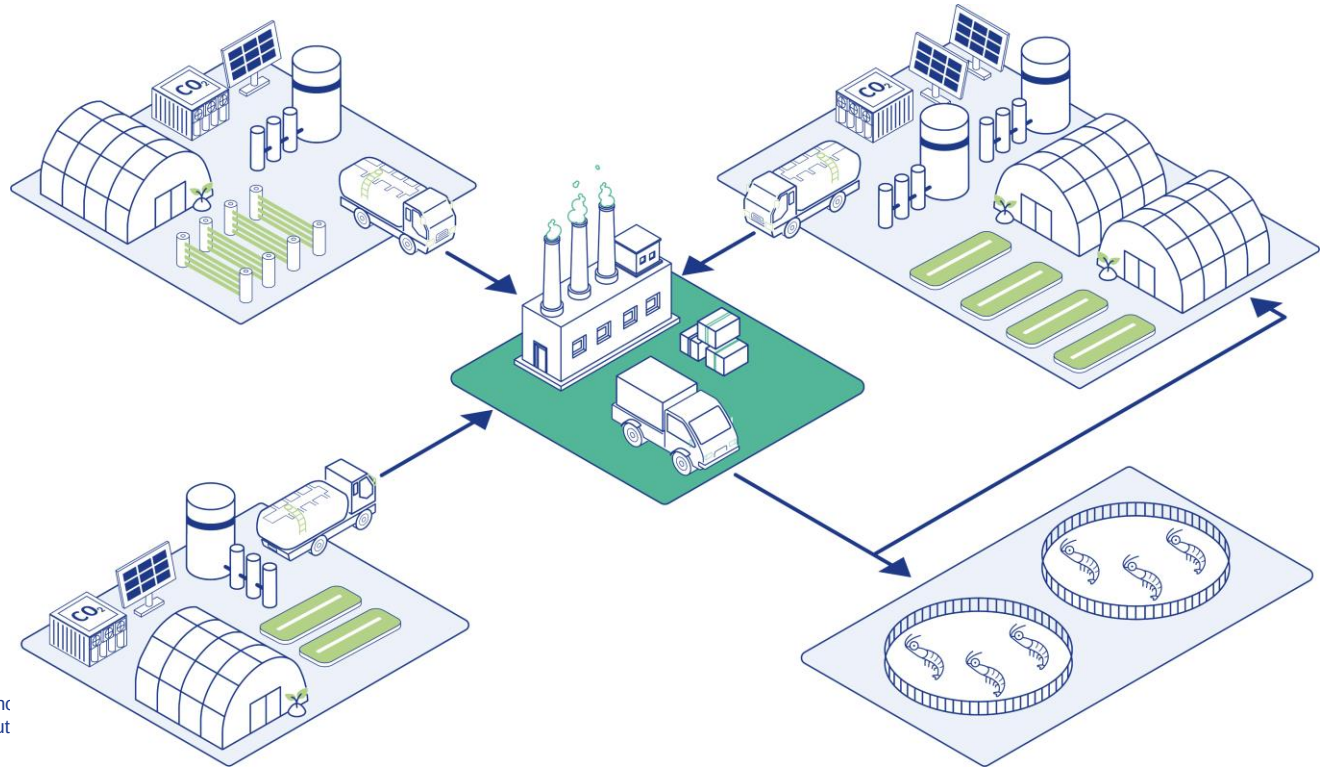
Expected outcomes

- **Reduce technical bottlenecks of algae cultivation**
- Upscale and demonstrate the **techno-economic viability of algae-based cultivation**
- Provide scientific evidence on **environmental benefits** and on **risks**.
- **Provide market knowledge** to align the development of new algae products to the uses and needs of various sectors.
- Support the development of innovative, competitive and sustainable agricultural production with better management of natural resources.



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The people

necton

http://realmalgae.eu/

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Thank you for your attention

jnavalho@necton.pt

realmalgae.eu

REALM algae

CIRCALGAE

CIRCular valorisation of industrial ALGAE waste streams into high-value products to foster future sustainable blue biorefineries in Europe

Budget: **10.332.894 €**

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responsible for them.

EMD EUROPEAN MARITIME DAY Brest 24-25 May 2023

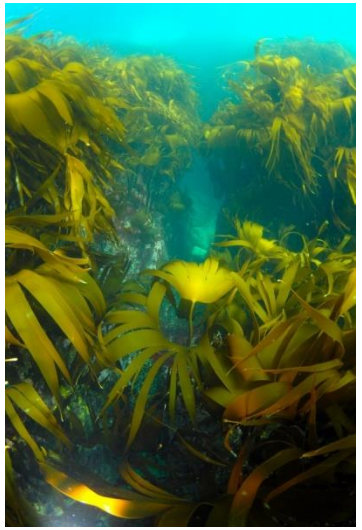
CONSORTIUM

- 15 companies
  - 7 large companies
  - 8 SMEs
- 3 research centres
- 1 university
- 2 non-profit organizations

CIRCular valorisation of industrial ALGAE waste streams into high-value products to foster future sustainable blue biorefineries in Europe

Budget: **10.332.894 €**

TOWARDS THE BLUE BIOECONOMY



Marine biomass…

Is underexploited, underrated and mostly unknown

Its cultivation/harvesting..

Does not compete with arable land

Does not consume sweet water resources

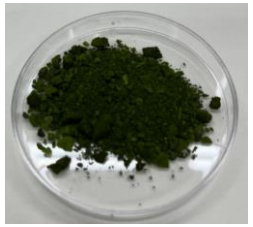
Less dependant on climate factors

TOWARDS THE BLUE BIOECONOMY

Laminaria hyperborea

Gelidium sesquipedale

Saccharina latissima



Algae processing usually…

Involves traditional (aggressive) processes

Sustainability is neglected in the process chain

Directed towards very specific market niches

65-97% of biomass is handled as a residue!

Gels

Vegan protein

Stabilizers

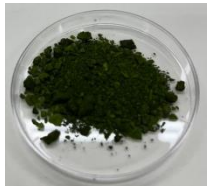
Soluble fibre

Texturizing

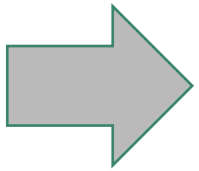
Immunomodulating

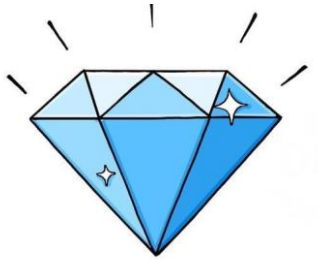
Anti-inflammatory

THE CONCEPT

Residues: Dicards, solid cakes, effluents





Upcycled high added-value ingredients

OBJECTIVES

Waste reduction

Sustainable exploitation

Circular Economy

Ingredients

+natural

+sustainable

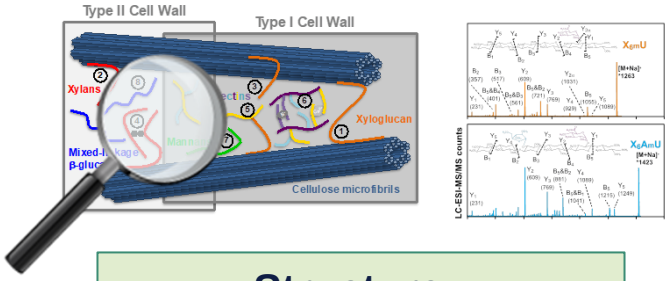
+affordable

THE CONCEPT

¿Subtrate?

¿Processing?

Characterization



Structure - Functionality

Ingredients

OBJETIVOS DE DESARROLLO SOSTENIBLE

OBJECTIVES

Waste reduction

Sustainable exploitation

Circular Economy

+natural

+sustainable

+affordable

CLEAN LABEL

THE CONCEPT

Pretratamientos eco-disruptivos

- Alta presión (HPH or HHP)
- Ultrasonidos

Maceración (green solvents)

Bioactivos LMW

Ácidos grasos

+ enzimas

Hot water extraction (90°-130°C)

Proteina

Ficocoloides

Beta-glucanos

+ enzimas

Acido/alkali

Oligosacáridos

Aminoacidos

Cero residuo

Celulosa

INGREDIENTES FOOD, FEED, COSMETICOS

Valor nutricional
Prebioticos
Anticoagulantes
Inmunoregulación

Gelificantes
Emulsionantes
Excipientes

EXPECTED OUTCOMES

Animal **Feed**

2 formulations with >10% CIRCALGAE ingredients (>200 kg demonstrator)

nuscience
safe & innovative nutrition

eagasc
Agriculture and Food Development Authority

Digestible, vegan protein/fiber with high nutritional value

Microbiome and innate inmune system modulation

Food Ingredients

5 formulations with >5% CIRCALGAE ingredients (>20 kg)

SALZBRÜCKE

CEAMSA

safe

IGV

Vegan Protein

Texturizers

Saturated fat substitutes

…used for vegan meat, healthy snacks

EXPECTED OUTCOMES

Cosmetic ingredients

SAPONIA

RNB

zetō

CIRCALGAE based texturizing excipients

CIRCALGAE bioactives

- **Antiintiflammatory**
- **inmunostimulating**
- **anti-coagulating**

body milk/ shower gel with algae excipients (> 50 kg)

facial solution for oily skin (> 10 L)

Toothpaste (>300 tubes)

powder shampoo (>300 bottles)

hydrating serum for sensitive skin (>300 bottles)

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CIRCALGAE

www.circalgae.eu

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biofun
Estructura y Funcionalidad de Biopolímeros Alimentarios

AlgaePro BANOS

Accelerating algae product development in the Baltic and North Sea

Frederick Bruce
SUBMARINER Network for Blue Growth EEIG

24-25. May 2023

Co-funded by the European Union

Mission

To demonstrate market accessibility and presence for sustainable and innovative algae products and solutions in the Baltic and North Seas.

Co-funded by the European Union

Project basics

Call: HORIZON-MISS-2022-OCEAN-01-06: Lighthouse in the Baltic and the North Sea basins – bringing sustainable algae-based products and solutions to the market

BUDGET: €12 million, EU contribution €11 million

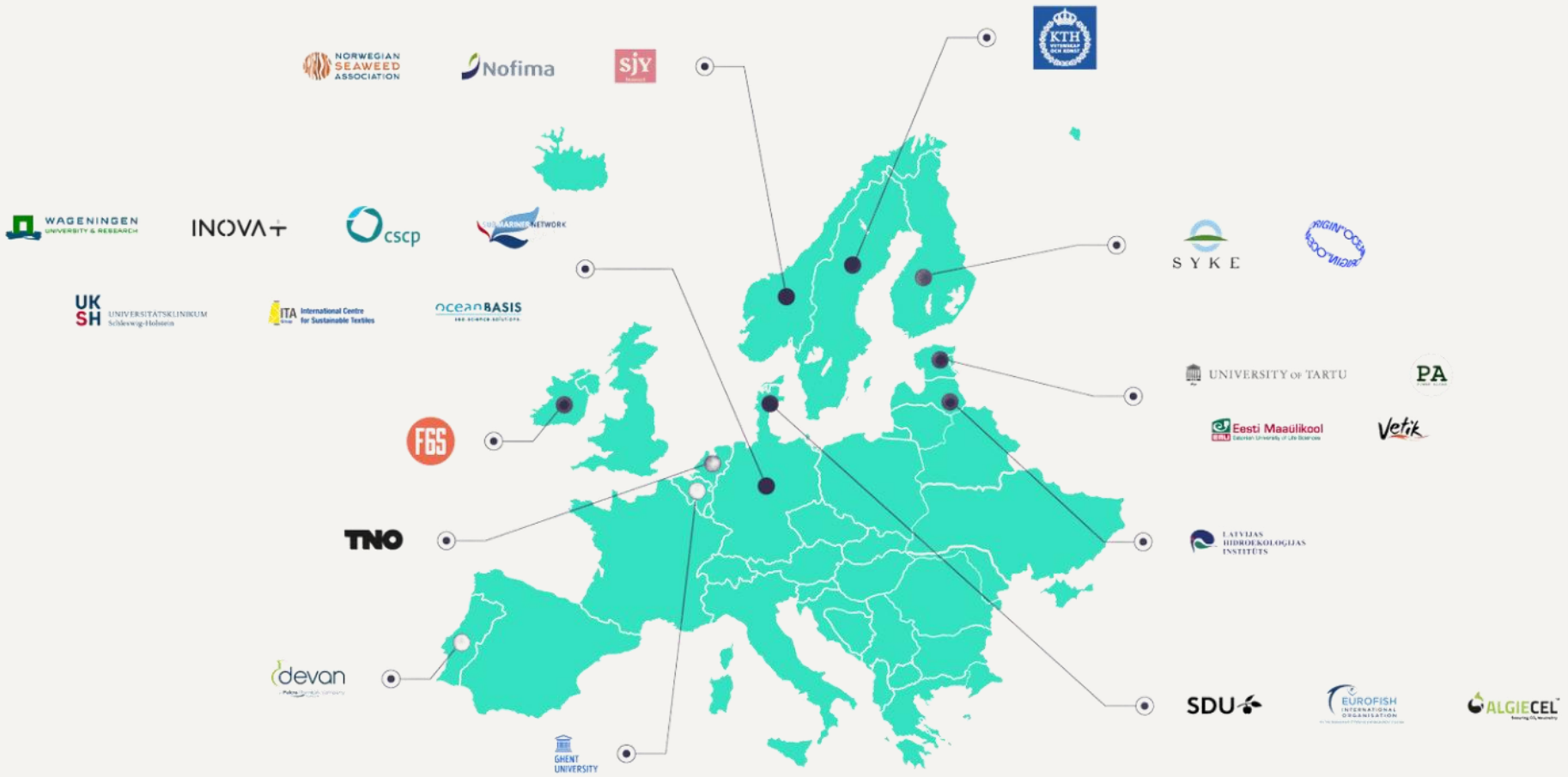
DURATION: 48 months from April 2023

CONSORTIUM: 26 partners

coordinated by SUBMARINER NETWORK

Co-funded by the European Union

Consortium


NORWEGIAN SEAWEED ASSOCIATION
Nofima
SJY
KTH
WAGENINGEN UNIVERSITY & RESEARCH
INOVA+
cscp
SUBMARINER NETWORK
SYKE
UK SH UNIVERSITÄTSKLINIKUM Schleswig-Holstein
ITA International Centre for Sustainable Textiles
oceanBASIS
UNIVERSITY OF TARTU
PA
Eesti Maaülikool
Vetik
F6S
TNO
LATVIJAS HIDROEKOLOĢIJAS INSTITŪTS
devan
GHENT UNIVERSITY
SDU
EUROFISH INTERNATIONAL ORGANISATION
ALGIECEL

Coordinator

Together we improve the Baltic Sea’s blue environment and economy.

The cooperation platform for actors and initiatives across the Baltic Sea Region and beyond who promote innovative approaches to the sustainable use of marine resources.

submariner-network.eu

KEY EXPLOITABLE RESULTS

A framework for sustainability

AlgaeProBANOS will develop a framework and tools for ensuring sustainability of algae product sectors to support entrepreneurs, governments and decision-makers with sustainable aquaculture management.

KEY EXPLOITABLE RESULTS

Digital solutions for algae businesses

The lighthouse project will create online dashboards for algae farms, products and logistics, and an Algae Business Club online matchmaking tool.

KEY EXPLOITABLE RESULTS

Co-creation with end-users

To gain insights for algae innovators and entrepreneurs, co-creation activities will be designed and implemented to better understand consumer needs.

KEY EXPLOITABLE RESULTS

Accelerating the algae sector

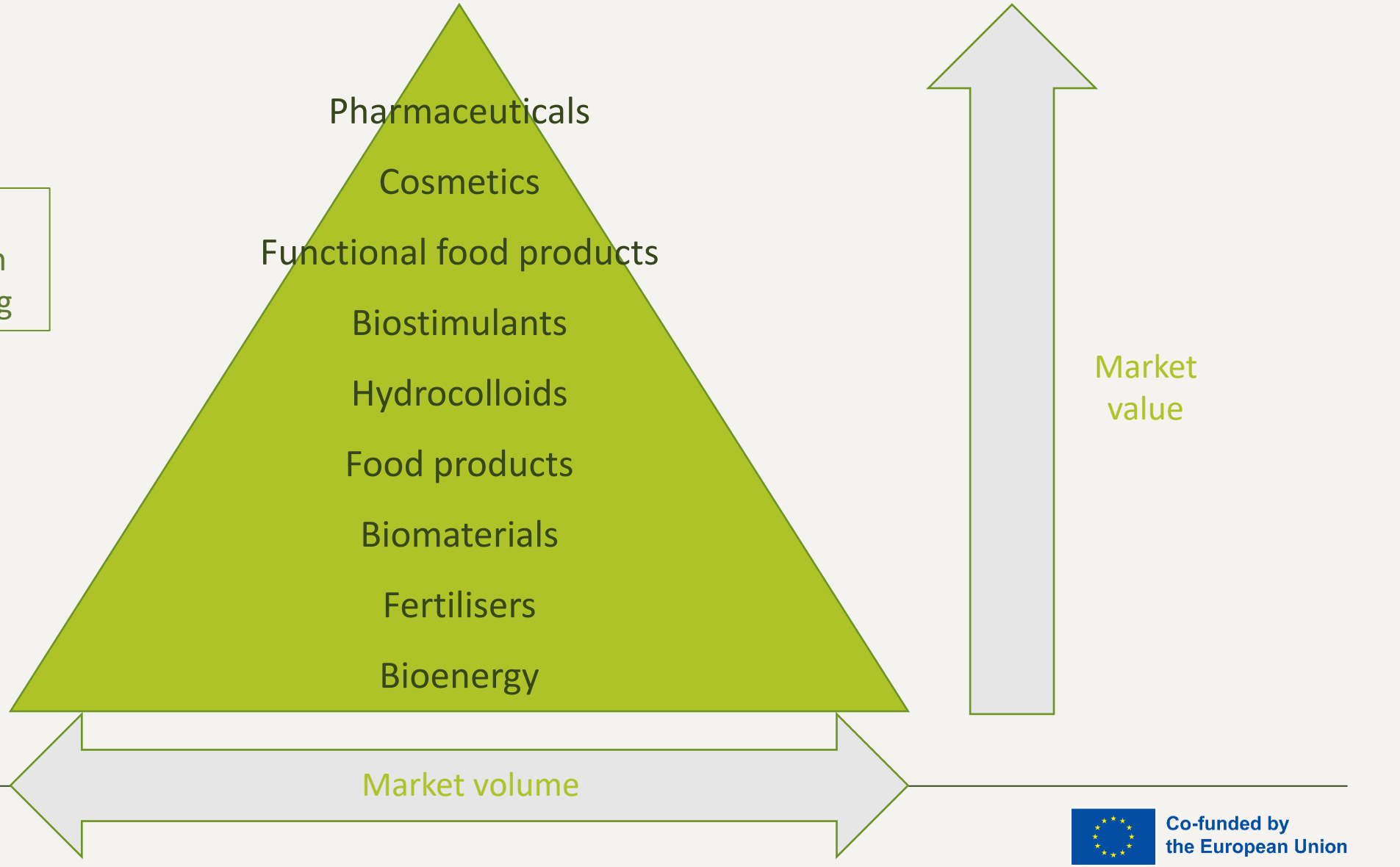
To accelerate development of new products and markets, the lighthouse will develop replicable Go To Market strategies and blueprints useful to algae entrepreneurs, and socio-economic impact assessments for policy makers.

AlgaeProBANOS product pipelines

Supporting product developments from TRL4-5 to TRL 7-8

Potential product market value

Combinations of products an option through biorefining



Co-funded by the European Union

Related projects

EU4Algae

SABANA
Sustainable Algae Biorefinery for Agriculture aNd Aquaculture

Nord AQUA

AquaVitae

MACRO CASCADE

Interreg Baltic Sea Region
GRASS
EUROPEAN REGIONAL DEVELOPMENT FUND
EUROPEAN UNION

Interreg Baltic Sea Region
ALLIANCE
EUROPEAN REGIONAL DEVELOPMENT FUND
EUROPEAN UNION

SEAMARK
Seaweed-based Market Applications

HW

FUCOSAN

Interreg
Deutschland - Danmark
EUROPEAN UNION

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contact@algaeprobanos.eu

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SPEAKERS

Moderator: **Adrien Vincent - EU4Algae**

Maris Stulgis (DG MARE) - Blue Bio economy, Algae and Marine Aquaculture

João Navalho (NECTON) – Realm project

Ólavur Gregersen (Ocean Rainforest) - Seamark project

Dr. Antonio Martinez-Abad (IATA) – Circalgae project

Frederick Bruce (SUBMARINER Network) – AlgaeProBANOS project

REALM

necton

CIRCALGAE

CSIC Consejo Superior de Investigaciones Científicas

iata Instituto de Agroquímica y Tecnología de Alimentos

SEAMARK Seaweed-based Market Applications

OCEAN RAINFOREST

AlgaePro BANOS

SUBMARINER NETWORK

Thank you!